REMARKS

Withdrawal of the final rejection and favorable reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 11-14 and 16-24 remain pending. All of the claims are rejected under 35 U.S.C. 103(a) as unpatentable over WO 97/00766 (Van der Loo *et al*, hereafter "Van der Loo") in view of JP 360151311 (Nanri *et al*, hereafter "Nanri").

In the Advisory Action, the Examiner takes the position that Applicants' arguments in the Request for Reconsideration, filed August 31, 2004, were not found persuasive. Applicants' arguments included, *inter alia*, an assertion that a case of *prima facie* obviousness was not made out because there was no evidence that (or why) compression would inherently result in loss of any frictional properties. In reply, the Examiner asserts that,

> "compression would hold the fibers in place such that there is no movement between the fibers and fiber layers. Thus, the frictional properties are not considered relevant since the fibers are tightly compacted during the formation of the molded shaped article."

Reconsideration is respectfully requested.

While the issue of compression and the effects thereon on "frictional" properties is still believed to be meritorious and will be addressed again below, it is respectfully submitted that there are other, independent, reasons for concluding that the embodiments of Applicants' invention which are reflected in the pending claims, would not have been *prima facie* obvious over the disclosures of Van der Loo et al, WO 97/00766 (WO 766) and Nanri et al, JP 360151311 (JP 311). Since these additional reasons may not have been fully addressed or considered previously, reconsideration is now requested.

Shape of Filaments

The disclosure of JP 311 is directed to essentially flat fibers, as characterized by "a rate of flattening of the cross section of the fiber of 1.7 or more," preferably of 2 or 3 or more (see, e.g., claims 1-3). The flatness is very clear from the photograph of fig. 1 of the JP 113.

As described in JP 113, the "larger the flattening rate, the better the property of bundling between the polyethylene fibers, and particularly the better the packing properties between the fibers in the case that a twist is given." (paragraph bridging pages 4 and 5 of English translation)

In contrast, according to WO 766, the cross-section aspect ratio is at most 3, preferably lower than 2, more preferably lower than 1.5. (page 12, lines 3-12) In particular, WO 766 explains that "high SEA values are obtained at low compressive pressures in ballistic-resistant moulded articles in which the filaments have a lower aspect ratio (being rounder)." (page 12, lines 12-15)

Therefore, the practitioner of ordinary skill in the art would not be motivated to adopt the flattened cross-section fibers of JP 311 in the ballistic moulded articles of WO 766, where "rounder" is better for ballistic properties. Certainly, the practitioner would not have had a reasonable expectation of successfully improving ballistic resistant properties by replacing the low aspect ratio fibers of WO 766 with the flattened fibers of JP 113.

Solvent

A second characteristic feature of JP 113 is the inclusion of liquid paraffin in the fiber. As explained on page 6 of the English translation, the polyethylene fiber contains liquid paraffin across the whole domain of the cross section of the fiber. The reason is to impart resistance against friction abrasion.

Notwithstanding the Examiner's supposition that imparting resistance against friction abrasion is not relevant for a product put under the compression contemplated by WO 766, nevertheless, it is still abundantly clear that the overall disclosure of WO 766 is to avoid the presence of solvent for or in the polyethylene fiber.

In this regard, the Examiner's attention is directed to the following disclosures in WO 766:

- Page 4, lines 14-15: "Preferably, uncoated fibers are used."
- Page 4, lines 28-30: "If a solution or a dispersion of the plastic is used in the manufacture of the monolayer, the process also comprises evaporating the solvent or dispersant."

- Page 6, lines 2-12: "Preferably, use is made of polyethylene fibres consisting of polyethylene filaments prepared by a gel-spinning process .... This process essentially comprises the preparation of a solution of a polyolefin of high intrinsic viscosity, ... and drawing the filaments before, during or after removal of the solvent."

(All emphases added.)

Accordingly, the practitioner would understand that the fibers and fiber layers used to manufacture the ballistic-resistant molded articles should not contain a solvent for the polyethylene fibers, such as liquid paraffin.

No expectation of improved ballistic resistant properties based on physical characteristics of polyethylene fibers

The original basis for attempting to apply the disclosure of JP 113 as relevant to the ballistic-resistant molded articles of WO 766 was based on the "motivation to provide a shaped article having high tensile strength and modulus of elasticity" (see Office Action of January 2, 2004, page 3, second full paragraph). This motivation was, presumably, provided in view of the improved processing properties, frictional resistance, and wear resistance offered by the fibers of JP 113. The Examiner further noted that JP 113 disclosed a tensile strength of 30 g/d or more and an initial elasticity of 800 g/d.

According to WO 766, for fibers to be "ballistically effective" they should have a high tensile strength of, preferably, at least 1.2 GPa (>14 g/d), a high tensile modulus, preferably at least 40 GPa (>467 g/d) and/or a high energy absorption. It is indicated that preferred polyethylene fibers have a tensile strength of at least 35 cN/dtex (>40 g/d), a tensile modulus of at least 1000 cN/dtex (>1133 g/d). Therefore, the practitioner of ordinary skill in the art would appreciate that the high molecular weight polyethylene fibers available for use in the ballistic-resistant molded articles, such as described on pages 5 and 6, already possess the tensile strength and tensile modulus values, suggested in JP 113, without the flattened cross-section and without the presence of liquid paraffin solvent.

Therefore, given the strong preferences for round fibers (e.g., aspect ratio of 1, as in Examples III-VI (page 15, lines 13-14)) and no solvent, the practitioner would not have been motivated to refer to the disclosure of flattened, solvent containing polyethylene fibers in JP 113 as providing an improvement in the polyethylene fibers for the ballistic resistant molded articles of WO 766 and, would not have had a reasonable expectation of improving the ballistic resistant properties of the molded articles of WO 766.

This conclusion is even further strengthened when one considers the disincentive of using low abrasion resistant fibers as fully explained in the previous responses (and, at least conceded by the Examiner for non-compressed fibers). But, even for compressed fibers, why would the practitioner be motivated, in the first instance, to ignore the strong admonitions against low friction fibers or additives, found in the literature and patent art, as previously discussed? Why would the practitioner go through the mental exercise of deciding whether for fiber layers placed under compression, perhaps the low friction properties of the fibers of JP 113 would not be so detrimental? The simple and direct answer must be that, absent Applicants' own disclosure of the improvements achieved in the ballistic resistant properties of a compressed shaped article of one or more layers of polyolefin fibers containing 0.05 to 5 wt.% of solvent, such as liquid paraffin, the practitioner of ordinary skill would not have been so motivated and would not have had a reasonable expectation of success.

For example, the Examiner's suggestion of the allegedly inherent result in loss of any frictional properties, also appears to assume that the presence of solvent does not affect adhesion of fibers to each other or to a matrix material, used in the molded articles of WO 766. The strong effect of a solvent on frictional properties of the fibers of JP 311, however, would equally suggest that other surface properties, such as adhesion to other surfaces (*e.g.* of other fibers or matrix material) will at least change, and likely be reduced. As such, for ballistic resistant molded articles, reduction of interfacial adhesion would be expected to have a negative effect on performance. Applicants have, nevertheless, shown a substantial improvement in ballistic performance properties, which would not have been obvious based on the disclosures in the prior art.

Therefore, for these reasons, and for the additional reasons previously submitted, the Examiner is kindly requested to reconsider the merits of the present invention and to allow the subject application.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Please charge any fees associated with the submission of this paper to Deposit Account Number 503-121. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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